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INFO SHEET

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Presence of Mycotoxins and *Salmonella* in Swine Finisher Diets

As part of the USDA's National Animal Health Monitoring System (NAHMS) Swine '95 study, 326 producers submitted seven 100-gram samples of finisher diet to be tested for mycotoxins using chromatographic methods. Samples were sent to USDA:APHIS National Veterinary Services Laboratories (NVSL) to be tested for aflatoxin, vomitoxin, zearalenone, and fumonisin (B1, B2, B3).

The USDA:ARS National Animal Disease Center (NADC) tested the feed samples on 300 of these operations for the presence of *Salmonella*.

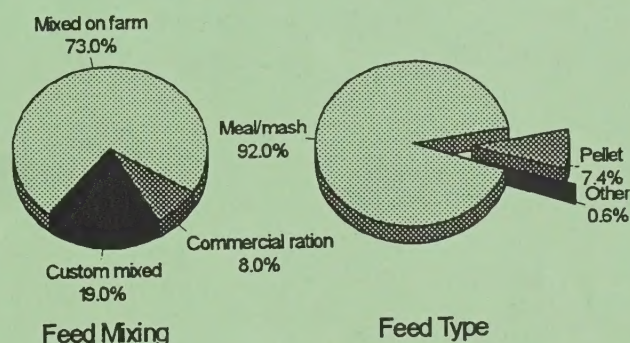
Mycotoxins

The environment contains hundreds of different fungi that are able to infest crops and stored feeds. A few of these fungi (such as *Aspergillus* and *Fusarium*) have the capability, under the right conditions, to produce toxins. These mycotoxins can accumulate undetected in swine feeds and reduce feed intake and growth rate, cause multiple reproductive losses, or suppress the immune system making pigs more susceptible to infectious agents such as bacteria and viruses.

Ninety-four percent of the contributing Swine '95 operations provided a corn-based ration in the form of a meal/mash for the feed samples taken from finisher diet. Over 70 percent of the samples were from diets mixed on the farm. Almost 75 percent of the farms had some evidence of mycotoxins in the finisher diets; however, only 2.5 percent of the operations had feed samples that exceeded the recommended maximum concentrations of mycotoxin for finishing hogs.

Figure 1

Percent of Operations by Characteristics of Finishing Diet Feed Sample



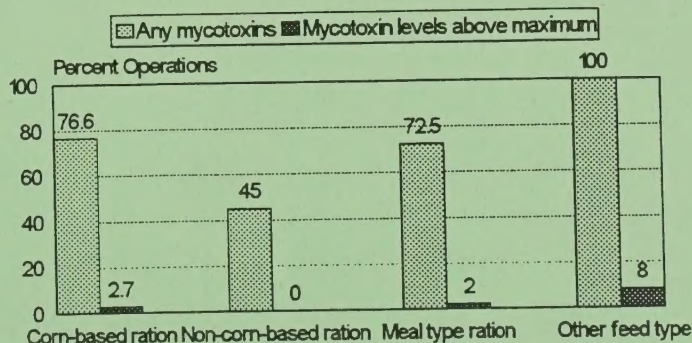
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Mycotoxins were detected in 45 percent of the non-corn based rations such as milo and barley. Nearly 77 percent of the corn based rations contained some level of mycotoxins (Figure 2). None of the non-corn based rations contained high concentrations of mycotoxins, while 2.7 percent of the corn based rations contained mycotoxins above recommended maximum levels.

Nearly 73 percent of rations mixed as a meal/mash contained some level of mycotoxins. Only 2.0 percent had high concentrations (Figure 2). Some level of mycotoxins were detected in all of the

Figure 2

Percent of Operations by Mycotoxin Levels Detected in Finisher Feed



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samples of feed types other than meal and 8.0 percent of these samples contained concentrations of mycotoxins.

Aflatoxins are produced by *Aspergillus* molds and are often associated with drought-stressed corn and improper conditions such as high grain moisture levels (above 14 percent). Young swine are particularly susceptible to aflatoxins which depress performance, reduce growth, and weaken the immune system. None of the Swine '95 feed samples contained aflatoxin levels above 200 parts per billion (ppb), the recommended maximum level for finishers.¹

Fumonisin is produced by *Fusarium* molds and at high levels can cause acute porcine pulmonary edema (rapid accumulation of fluid in lungs). They were first identified in 1988. The NVSL tested Swine '95 feed samples for Fumonisin B1, B2 and B3. None of the feed samples contained levels above 10 parts per million (ppm), the recommended maximum concentration in finishing feed.

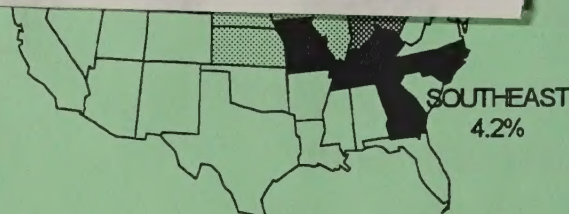
Vomitoxin and zearalenone are produced by *Fusarium* molds also. Zearalenone differs from other mycotoxins in that it is associated with cold, wet conditions, and therefore, is more common in the northern tier of the Midwest. Only one operation had zearalenone levels above 1.0 ppm and eight operations (2.1 percent) had vomitoxin levels above the recommended level of 1.0 ppm¹.

Many of the factors contributing to production of mycotoxins, such as humidity and drought-stressed corn, are beyond the control of a pork producer. However, producers can take preventive measures including placement of grain in dry storage and maintaining below 14 percent moisture. Frequent cleaning of feed storage bins, use of fungal inhibitors to prevent growth, and rapid use of ground feed are additional methods of preventing mycotoxin production.

Salmonella

Salmonella is a bacterial pathogen which causes disease in both pigs and humans (and most other animals). *Salmonella* can be introduced to a swine

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operation through carrier hogs which shed the organism. Other sources of salmonellosis include the environment, rodents, and feed contaminated with *Salmonella*.

Salmonella was isolated from finisher feed samples collected on 17 of the 300 (5.7 percent) operations participating in feed collection. A majority of the feed samples contaminated with *Salmonella* were located in the Midwest (Figure 3). Of the 282 feed samples where the primary grain was corn, 14 (5.0 percent) were positive for *Salmonella*. For the 15 feed samples consisting of some other grain besides corn, three (20.0 percent) contained *Salmonella*.

As few feed samples were taken from each farm, these numbers likely underestimate the amount of *Salmonella* contamination in finisher feed. Additional research is necessary to confirm these estimates including the suggested relationships with geography and grain type.

NAHMS collaborators on the Swine '95 study included the National Agricultural Statistics Service (NASS) and State and Federal Veterinary Medical Officers and Animal Health Technicians.

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¹ Mycotoxins and Swine Performance fact sheet (6/92) in the University of Illinois at Urbana-Champaign Pork Industry Handbook.